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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/056,022	01/28/2002	Koji Uchimura	Q68273	2604

65565 7590 03/01/2007
SUGHRUE-265550
2100 PENNSYLVANIA AVE. NW
WASHINGTON, DC 20037-3213

EXAMINER

SIEFKE, SAMUEL P

ART UNIT	PAPER NUMBER
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1743

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary	Application No.	Applicant(s)	
	10/056,022	UCHIMURA, KOJI	
	Examiner	Art Unit	
	Samuel P. Siefke	1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 4 and 5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 5 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/22/06</u> | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Che et al. (USPN 5,604,587) in view of Reick et al. (USPN 3,641,332).

Che discloses a waveguide that is in the form of a capillary having a reflective surface defined by a material having a refractive index of less than 1.33. Excitation light is transmitted axially into the liquid at an end of the waveguide. The excitation light is transmitted the length of the waveguide, by reflection from the reflective surface, causing the fluid to emit Raman spectra. The waveguide 10 is constituted by a suitably shaped vessel 12, for example a capillary, for containing a liquid core 14, i.e., an

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aqueous sample. Capillary 12 may be fabricated from glass, quartz, transparent polymers such as polymethyl methacrylate (PMMA), polyvinylidene fluoride (PVDF) and ethylene tetrafluoroethylene (ETFE), or similar materials. Commercially available fluorocarbon material having a refractive index which is suitable for use in the practice of the present invention is sold by the Dupont Company under the trademark "Teflon AF". An arrangement wherein reflection of excitation light occurs at the exterior surface 18 of capillary 12 also allows the interior surface 16 of the capillary to be modified to reduce the adhesion or retention of molecules in the liquid due to surface potential. Referring to FIG. 1, the waveguide/cell 10 of a Raman spectrometer comprises a length of tubing defining a capillary 12 which may be wound (flexible) around a cylindrical form 20 for convenience. As shown in FIG. 2, the waveguide 10 is comprised of a long capillary 12 clad with a polymer material 38 having a refractive index lower than that of the sample liquid. The capillary wall and the sample liquid 14 together constitute the core. The cladding 38 should have a thickness of at least four (4) times the wavelength of the light to be propagated by the waveguide, i.e., a cladding thickness of 2 μm to 3.6 μm is appropriate, and may be applied by dipping, spraying or other means known in the art. The cladding 38 protects the capillary from degradation due to light, moisture, oxidation and environmental contaminants. Such degradation typically causes the capillary to become brittle. Therefore, a Raman cell manufactured in accordance with the present invention is more flexible than conventional Raman cells. For example a Raman cell manufactured in accordance with the present invention may be wound into a three inch coil since capillary 12 supports the disclosed circular cross-sectional shape

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of the cell, the physical strength requirement for the cladding material is reduced. A protective outer coating or jacket 42 of stainless steel or other suitable material may be employed to protect the cladding material from scratching and mechanical abrasion. It is inherent that stainless steel is not transparent and will prevent light incident from the outside from transmitting on the inner tube side. Che also teaches the capillary is flexible because the capillary is wound around a cylindrical form 20 (col. 3, lines 49-52). Che does not teach an air layer.

Reick teaches a fiber optic illumination system that comprises a flexible core of resinous material (Teflon) of large diameter contained within a flexible cladding tube (protective) and separated therefrom by an air layer having a relatively low refractive index compared to that of the core (abstract; col. 4, lines 48-52). The cladding tube (outside) is made of the lowest refractive index in order to protect the surface from scratches, dust, grease, all of which give rise to losses. Reick's main objective is that a light pipe constituted by a flexible core C enclosed in a flexible cladding tube T but separated therefrom by a film of air A, so that the protective properties of the cladding tube are combined with the optical effects of air. Reflection occurs at the interface of the core C and air film A, the cladding serves to strengthen the tube and to protect the core (col. 5, lines 48-75). Therefore, it would have been obvious to one having an ordinary skill in the art to employ the air layer of Reick so that the protective properties of a cladding tube are combined with the optical effects of air which has the lowest possible refractive index, which maximizes the total reflection at the surface of the inner tube and the air layer.

Allowable Subject Matter

Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed 11/22/06 have been fully considered but they are not persuasive. Applicant argues, "Che suggest that the jacket 42 may be made of metal to mechanically protect the inner tube. However, there is no disclosure relating to preventing the stray light." Che teaches a protective outer coating or jacket 42 of stainless steel or other suitable material may be employed to protect the cladding material from scratching and mechanical abrasion. It is inherent that stainless steel is not transparent and will prevent light incident from the outside from transmitting on the inner tube side.

Applicant argues, that the instant application provides for simpler manufacturing process to make the capillary tubing. The Examiner would like to remind the Applicant that the claims are directed to a device and therefore the prior art must show a device that is structurally capable of performing the intended use of the instant application. The Examiner has provided this burden by combining Che in view of Reick.

Applicant argues, "Replacing the clad 38 of Che with the air layer of Reick will make the device of Che inoperable for its intended purpose." The Examiner maintains that Che states the clad 38 be made of a material that has a lower refractive index than

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that of the liquid passing through the capillary. Since the air layer of Reick has the lowest possible refractive index and states that this is desired property when used with a high refractive index core as seen in col. 5, lines 48-57, there is motivation to replace the clad 38 of Che with an air layer because the air layer provides the lowest possible refractive index possible.

Conclusion

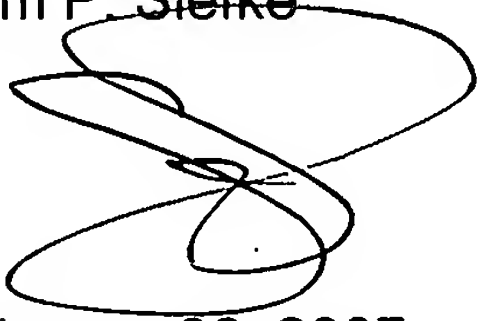
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel P. Siefke whose telephone number is 571-272-1262. The examiner can normally be reached on M-F 7:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on 571-272-1700. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Sam P. Siefke

A handwritten signature in black ink, appearing to be 'S P Siefke', written over the printed name.

February 26, 2007